OBSERVATIONS ON RENAL CALCULUS,

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BY

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REFLECTIONS SUGGESTED BY A SERIES OF CASES OF RENAL CALCULUS.

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When "renal surgery" was first recognised as a term in the surgical vocabulary, it became perhaps too much the fashion to recommend formidable operations for the relief of conditions which we now know may be successfully treated by milder methods, or with greater wisdom let alone. The more, indeed, this branch of our art advances, the more obvious becomes the necessity of greater knowledge, especially in two directions, that of *symptomatology* and that of *prognosis*.

Those of us whose professional career does not long antedate the opening up of this new field of surgery have had comparatively little chance of watching cases of renal calculus to their natural end; our senior brethren would therefore be conferring upon us a great benefit if they were to put on record their experience in this direction. And, if these observations be true with regard to prognosis, the same may be said with equal force in respect of symptoms: the symptoms of renal calculus are often so obscure, and often so peculiar, and the natural history of the disease is probably so imperfectly described, that it becomes the duty of all who meet with unusual cases to put some note of them within reach of those who are enquiring into the subject.

My friend Mr. Knowsley Thornton, of whose work it is impossible to speak too highly, has staggered us with the assertion that all the symptoms of stone in one kidney may be caused by the presence of a stone in that of the opposite side, and we are anxiously on the look-out for facts to substantiate or to

disprove his argument. If this really be the case, our firmest position with regard to the diagnosis of this disease is undermined, and, on the other hand, a strong support is given to his contention that it is wisest, before trying to cut out a stone through the loin, to make an abdominal section, and to investigate the kidney through it by palpation. I do not say that the argument is altogether convincing, for it is certain that some stones could never be felt in this way. We know that on more than one occasion a stone, and one which has been the cause of severe symptoms too, could not be felt through the kidney substance, even after the organ itself had been removed, and was lying before the observer on the table. It is also no doubt possible that the operator may be misled by such a procedure, and may perhaps remove a kidney full of stones which were causing no symptoms, while he leaves behind one small, and therefore impalpable, calculus on the opposite side, which has been the cause of all the patient's troubles.

Still Mr. Thornton has brought forward some very remarkable facts, most suggestive of a line for observation. He mentioned, for example, last session, in a discussion at the Clinical Society of London, the very interesting case of a little girl, in whom two distinguished physicians had diagnosed stone on one side, but from whose opposite kidney he removed several stones through the loin, after ascertaining their presence by means of an abdominal incision; and it must be added that, with the exception of one slight and doubtful attack of pain, the symptoms, which had been relieved by the operation, had not recurred.

I had a case myself under treatment at University College Hospital last year, which may conceivably lend support to this position. The patient, a young man, twenty-four years of age, had suffered intensely with right renal colic for three years. He came from South Africa for treatment, and was first under the care of my colleague, Mr. Beck, who exposed the right kidney, on June 25th, 1886, through the loin, and pricked it with needles in all directions without finding a stone. The symptoms were unrelieved, and when he came under my observation, in the vacation, they were so severe and so definitely limited to the right side, that it seemed best to expose the kidney again, and to incise it.

I did so on September 2nd, 1886, and introduced my finger carefully into the pelvis, exploring with great deliberation, and as I believe thoroughness, every calyx, but no stone was to be found. Blood was passed in quantity with the urine, after the operation, showing that the ureter was at all events not completely blocked, and indeed no urine at all escaped by the wound, which healed most kindly in about three weeks. The colic, however, remained, and the patient left the hospital on October 23rd; but seven weeks after my operation he passed a stone as large as half a date-stone *per vias naturales*, and gives me the credit of having dislodged it, which I am far from sure that I deserve. The stone measured $\frac{1}{2}''$ by $\frac{1}{3}''$, and was grooved in two places like a date-stone, so that it is conceivable that it might lodge in the ureter without obstructing it. It was finely tuberculated, and weighed seven grains. I questioned the patient closely about pains in the other loin, and all that he would allow was, that sometimes the pain shot over to the other side, but that he was quite clear the trouble was on the right. But after all we are left in a state of uncertainty: it is no doubt conceivable that the stone may have been all the while in the left kidney; but on the other hand it is possible that it was lodging in the right ureter without completely blocking it; or that I simply missed it when examining the right kidney.[1]

In September 1885 I removed a stone (A, Fig. 1) from the right kidney of a man aged about 30. For many years his symptoms had been referred only to the bladder, and he had been treated by most competent surgeons for cystitis over and over again, thus affording another illustration of the often-observed fact that every symptom of stone in the bladder may result from the presence of a stone in the kidney. At last, however, unmistakable right renal colic set in, and recurred again and again. It was so definite that I felt justified in cutting down on the right kidney through the loin, though it could not be felt in the very least. It was indeed rather a small kidney, and very high up, so that in cutting through the renal substance to extract the stone, which lay in its posterior surface, I had to hold the scalpel by the tip of its handle. On careful examination

[1] It is a most suggestive fact, that since writing the above I have heard from him that he is again laid up in bed with *left* renal pains.

I could feel no other stones by palpation from outside, and as the extraction of this one did not open up the pelvis of the kidney freely, I was content to leave it alone, and did not explore it thoroughly. The wound healed up readily, and the man was out of bed in a few days. But now comes in the special interest of the case: The first day he was up he had colicky pains on the left, that is the opposite side, and passed both then and on subsequent occasions several small fragments of stone, one of which is shown in B, Fig. 1. The question naturally arises: Did they really come from the left side? or was the left-sided pain caused by the fragments passing down the right ureter? As the man has, as far as I am aware, kept well since the operation, now more than eighteen months ago, these queries, though highly suggestive, must unfortunately remain unanswered.

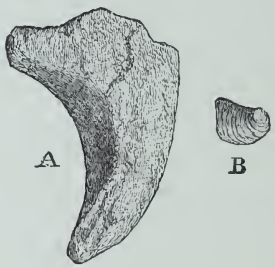

Fig. 1.

The post-mortem room of every hospital frequently illustrates the fact that large calculi may cause little or no disturbance, while clinical observation as often proves that a small rough stone may give rise to great pain, or to copious hæmorrhage. Most observers have seen at the autopsy of a person who has died of some other complaint a stone completely blocking the ureter, and the kidney above it shrivelled to a mere remnant of its former dimensions. This kidney must have passed through the stage of hydronephrosis before it dwindled, but the patient has perhaps never been conscious of, or has forgotten, any renal trouble. I could detail in this connexion the case of a patient with hydronephrosis of at least five years' standing, aspirated in 1885, who has been at least so far free from trouble since the operation that she has not returned for treatment; many other

examples of the kind might be mentioned. A distinguished member of our profession once told me of an old man whom he saw on his death-bed, and who mentioned casually that he had been told by Sir Benjamin Brodie thirty years before that he had a stone in his kidney, but that it had never caused him any trouble. The calculus was found post-mortem: a light one, as large as half the little finger, and of the weight of about half a sovereign. Again, a very large kidney full of stones, which I removed by an abdominal incision with its capsule several years ago, and which is described in the Clinical Society's *Transactions*, vol. xv. p. 134, gave rise to hardly any symptoms, except pus in the urine. On the other hand, the little porous oxalate of lime calculus (shown in Fig. 2), which was passed by a patient about thirty-four years of age, caused very considerable and prolonged hæmorrhage, and when it descended renal colic of the most severe nature. His case is in many ways instructive, and I will dwell upon it in some little detail. For about ten years before this

Fig. 2.

stone was passed this patient suffered from attacks of apparently ordinary typhlitis without fever, recurring at varying intervals, and usually seeming to depend on some error in diet, or on exposure to cold after a full meal, though this was not always the case. Sometimes it appeared to follow severe or prolonged exertion, but not unfrequently it began at night, as is, I think, not uncommon in the case of renal pains; I have at all events met with more than one example of nocturnal renal colic. I particularly draw attention to the nature of the pain, because it is not sufficiently recognised that intestinal colic may be the only symptom resulting from the presence of either renal or biliary calculi. The first attack of typhlitis was apparently an ordinary one, accompanied by fever, and laying him up for a fortnight; the others began usually with colicky pains about the splenic flexure, which gradually passed back to the cæcum, and were accompanied by nausea and constipation. After a few hours the nausea would pass away, but intense tenderness was left over

the cæcum, which lasted for a few days and gradually subsided. No symptoms referable to the kidney presented themselves for years, except that on one or two occasions after very severe exercise the urine was described as brown, and no doubt contained blood. At last, in the early part of the summer of 1881, after a game of tennis, the urine was noticed to be porter-coloured; and for several months after this blood was passed almost constantly, while there was only the very slightest possible discomfort to indicate that the trouble was on the right side. Then there came an attack of intestinal catarrh, on the top of which there was developed one of the old cæcal troubles, which was apparently slowly passing away when the pain increased and changed into a typical right renal colic, lasting for a night. The next day all the pain was gone, and a week or two afterwards the stone was passed into the prostatic urethra, from which it was extracted with urethral forceps. Since that time there has been no return of the cæcal pain.

Another interesting fact about this patient is that he is a neuralgic subject. There had been many attacks of right supra-orbital intermittent neuralgia, which had yielded to no remedy, but had stopped spontaneously, sometimes suddenly, sometimes gradually. Whilst the hæmaturia lasted there was slight neuralgia every day for months, the remnant of a more severe attack. It left him on the day of the renal colic. For years after this he was free from neuralgia, and then another severe attack occurred, which, after a few days, disappeared abruptly, and on the following day there was slight hæmaturia. This is the only renal symptom that has shown itself, except very occasional slight aching pain in the loin, but it must be added that the neuralgia has returned from time to time. The evidence of connexion therefore between the neuralgia and the kidney must only be taken for what it is worth. It is interesting as suggesting at all events how far afield we may have to search before finding a reflex cause for this mysterious and intractable complaint.

I wish then to insist that repeated attacks of intestinal colic, especially if accompanied by nausea, should lead the practitioner carefully to investigate the state of the kidneys and the urine; and to keep his mind open as to the possibility of the symptoms

being due to the presence of gall-stones, for I may observe, in passing, that I know of a patient, a lady, who, when she was about the age of sixty, suffered for years from most troublesome attacks of colic, affecting the colon, which she completely lost after a fit of jaundice, accompanied by great distension of the gall-bladder, and followed by the evacuation of a considerable number of gall-stones. Instances of both classes of cases are, I believe, far from uncommon.

I wish also to mention two other symptoms which have come under notice, and which, though certainly not common, are presumably not accidental. My friend Dr. J. Mitchell Bruce has observed on more than one occasion rectal troubles accompanying or preceding the descent of a stone. In one remarkable case the first indication of the presence of the stone was a pretty free hæmorrhage from the rectum, the stone being passed down the ureter shortly afterwards. Lastly, I have seen, twice in the same patient, well-marked *Herpes zoster* in the course of a lumbar nerve make its appearance during attacks of very severe pain, which were caused by a stone impacted in the ureter.

Before closing these disjointed remarks on the *symptoms* of renal calculus I wish to say a few words on the allied subject of diet and medical treatment, but only in the way of query; for it is one which does not properly come into the province of the surgeon, though it might well form the text for a treatise in the hands of a physician; indeed there are many questions which must often present themselves to both, to which a definite answer is still wanting. What, for instance, after all, is the best diet for a patient with a stone in his kidney? and do those with the uric acid and with the oxalic acid diathesis stand at all upon the same footing in this respect? What is to be said about alcohol? and is champagne really a poisonous drug for them all? or how many of them will have an aching loin if they simply indulge in aerated waters? Do they do better with copious libations of water, or if they cut down their supply of fluids? How do they bear meat and sugar? What chance is there of obtaining a solution or spontaneous rupture of a stone, if the patient put himself under a course of treatment at Contrexéville? and is this line of treatment more likely to be successful if carried out

in that dull and distant locality than if undertaken at home? And, in fine, does not the question of dieting really resolve itself into that of what the individual patient can best assimilate, and may we not often make a mistake by laying down the law too strictly in this respect?

But I must pass on now to ask a few questions with regard to *prognosis*, and to supply such imperfect answers as my experience will yield.

In the first place, How long can a person go on with a kidney full of stones? We know that with a single stone he may live indefinitely, provided that no degenerative changes take place in the kidney. But is this also the case when the kidney is much enlarged with a dilated pelvis and atrophied secreting substance? And still more important is it to determine to what extent the chance of life is shortened if there be also pyelitis and a secretion of pus in small or in large quantity. The great importance of these questions becomes apparent when we have to decide whether to recommend a young, a middle-aged, or an old person either to be content to bear the ills he has, or to submit to the inconveniences of a nephrolithotomy or the perils of a nephrectomy.

In 1881 I opened a large perinephritic abscess for a vigorous old clergyman over sixty years of age. He was as gouty as he could be, and had a very large kidney, no doubt full of stones, which, however, had given him little or no trouble for years, for he could walk and ride *ad libitum*, and eat and drink almost what he pleased without dyspepsia. I think it would have been bad practice to have laid this kidney open and to have removed the stones, for although such an operation would not have involved any serious risk to life, it is quite possible that the wound would not have healed and that the question of extirpation of the kidney would have afterwards arisen: and this is a serious matter in a man of his age. The abscess remained open for some time; at one period it ruptured into the kidney, and the discharge of urine from the wound alternated with the escape of pus with the urine. Now the sinus which remains is sometimes patent, sometimes closed; it discharges a very small amount of pus, and the patient calls it his safety-valve. I have removed a large stone from his bladder by lithotrity on another

occasion; but his general health continues to be excellent and his local troubles almost nil.

In March 1882 I saw, with Dr. J. Mitchell Bruce and Dr. Rennie of Foochow, a gentleman thirty-eight years of age, who gave the following history. In 1874, one day (either morning or midday) he first noticed that his urine was thick, and it had continued to be so ever since. Some time later he passed blood—on one occasion after a game of racquets, and at a later period he passed blood for some days—micturition being accompanied by pain at the tip of the penis. This, however, passed off. For three months before I saw him he had felt pain in the left lumbar region, which had, however, much diminished. He looked well, but said that he had lost flesh, and in fact he had lost three stone in weight. He had a large nodular tumour, obviously renal, on the left side; not very easily movable and probably fluctuating. Pressure on it caused pain, both locally and shooting down into the testicle. The urine was acid or neutral, and contained a large amount of pus—often as much as $\frac{1}{6}$. He passed about 40 ounces of urine in the twenty-four hours, containing about 4 ounces of pus. The specific gravity of the urine was about 1025; the amount of urea in twenty-four hours, 400 to 450 grains. He had no stone in the bladder.

In this case, after consultation with Sir William Jenner, we advised the patient to allow of an exploratory puncture being made with the object, if the needle struck a stone, of opening the kidney through the loin. I urged it, as I think I should do now, because I thought that a short time would show the onset of distinct albuminoid degeneration. But it is not by any means clear that the advice was sound. At all events he did not follow it, and when we last heard of him, in February 1884, he wrote: "Am now feeling and looking quite myself again. A general decided improvement set in about September, and now, although the swelling is, I think, still present, the water is nearly clear, and at times quite." The later chapters of this history will be awaited with great interest, for if the suppuration in his kidney be really and permanently arrested, and if such a result be at all a common one in people at his time of life, it would be necessary in discussing the advisability of an operation to put the *pros* and *cons* in a more

guarded manner than we have perhaps been in the habit of doing.

Supposing, however, it be decided to attempt nephrolithotomy, it is encouraging to know that a small clean cut into a comparatively healthy kidney or pelvis—I mean one that is large enough to allow of the introduction of a finger—is almost sure not to leave a permanent urinary fistula. Urine may escape for a while, but in time it is practically certain to heal. The same applies to the ureter, if this tube be not completely torn across. At the end of the second part of this paper will be found the notes of a case illustrating this fact, where a stone was extracted from the ureter and where healing took place completely after a time; but, on the other hand, one which forms the subject of a paper in the Clinical Society's *Transactions* for this session, vol. xx., is a good example of what must happen if the rupture of the ureter be complete. As in other recorded cases, a huge cyst containing urine was formed, which, after being frequently tapped, was at last freely incised in the loin and drained; a urinary fistula resulted, which showed no signs of healing, and the patient, a child, suffered severely from time to time from accumulations of urine and pus in the remains of the cyst. I felt obliged, therefore, to remove the kidney, which was accomplished with an excellent result.

It is, however, perhaps more important to ascertain what is the prospect of healing when a free incision is made into an old suppurating kidney, for these, more often than healthy ones, seem to require such rough handling. The history of the following three cases is interesting from this point of view, and has been to myself very instructive.

In the year 1884 a woman, forty-eight years of age, was under my care at University College Hospital on account of a pyonephrosis on the right side. It was supposed to have originated with an attack of typhoid fever six months before; at all events it had not been observed previously. The patient was passing a very considerable amount of pus with the urine, but the kidney was notwithstanding distended to a very large size. I made an incision into it through the loin, evacuating 14 ounces of matter, and then explored with the finger the dilated calyces of the pelvis and the orifice of the ureter. These

were all enormously dilated, but nowhere was any calculus discovered. A long probe was then passed down the ureter without striking any hard substance or meeting with any obstruction, and accordingly a full-sized drainage tube was inserted into the cavity, the wound being dressed antiseptically, as the pus was free from smell. On subsequent occasions the bladder was sounded, and a vaginal examination was made with the view of finding if a stone were impacted at the orifice of the ureter, but none was found, and we are thus quite at a loss to discover the cause of the dilatation of the ureter and the kidney.[1]

After the incision the patient gradually improved very much in health, and indeed became very stout. The discharge from the wound in the meantime diminished by degrees, as did the quantity of pus in the urine; and thus, though I often told her that I did not anticipate that the wound would ever heal, and consequently rather advised her to submit to what I believed would have been a simple and safe nephrectomy, it did not appear to be right to urge this at all strongly, nor to fail to put its possible dangers fairly before her. She selected to put up with the discomforts of the fistula; and I am glad that she did so, for after about three years it closed, and she is now in good health and free from discomfort. The kidney is certainly still to be felt and is enlarged, but there is little or no pus in the urine. It may of course give further trouble, but it is far from certain that it will do so; indeed the recollection of those old shrivelled kidneys before referred to as not by any means uncommon in the post-mortem room, though their history is unknown, would encourage the hope that the patient has seen the last of her troubles.

[1] As these sheets are passing through the press (September 22nd, 1887) I have met with the first case of stone impacted at the lower end of the ureter that has occurred to me. A woman between thirty and forty, the subject of myxœdema, whose symptoms had baffled all attempts at diagnosis, but who was passing pus and blood with the urine, is now at University College Hospital. This afternoon I dilated the urethra, and on introducing the finger found a large, rounded movable tumour projecting into the bladder, which proved to be caused by a stone an inch and a quarter long, and weighing ninety-two grains, at the lower end of the right ureter. It was easy to force the stone into the urethra by two fingers of the left hand introduced into the vagina, and after enlarging the orifice of the ureter to extract it. It is interesting to note that the stone was not discovered on careful vaginal examination.

The *rationale* of the development of a dilated ureter with hydronephrosis or pyonephrosis, but without apparent cause, has not yet been elucidated. Some mechanical obstruction to the urinary tract below the point of dilatation must surely always exist, and in the majority of cases it can be discovered; but there remains a minority in which it is not obvious. I have made a post-mortem examination on a young child with two enormously dilated ureters, but quite failed to find any cause for the condition. In cases such as that under discussion it seems probable that either pyelitis or cystitis may have preceded the dilatation, and that the proximate cause has been either inflammatory thickening about the point where the ureter enters the bladder, or else the temporary but perhaps frequent plugging by portions of mucus on their way down from the pelvis of the kidney.

A somewhat similar case was under my care at the hospital about the same time, but here on incising the kidney two small stones (Fig. 3) were found, not free in the pelvis, but embedded in the renal tissue. They had in fact to be dug out with the tip of the finger. It is possible that here a calculus was the cause of the original trouble; but also possible that the stones were merely secondary developments in a strumous kidney. Mrs. E., aged about thirty, was admitted under my care at the hospital in March 1885. Her mother and maternal grandfather had died of phthisis, but there was no other important fact in her family history. She had been confined seven months previously, and the child was healthy. The labour was a troublesome one, there having been difficulty in expelling the placenta; a discharge had lasted for eight weeks afterwards, and there had been pain in the back ever since. She was said to have had "inflammation of the kidneys" five and a half years ago, but most likely it was merely rheumatism: the symptoms being pain in the back, constant but not severe, and mostly on the left side, the urine having been clear though dark. She had been obliged to keep her bed three days, after which she was quite well.

On January 4th, 1885, she had an attack of severe and continuous pain on the left side, extending to the back and accompanied by vomiting, and the urine became very thick. She was obliged to take to her bed, and on the 6th the pain

passed away, at the same time as a copious discharge of matter occurred in the urine, which was then offensive. In February the left leg became œdematous, and the dropsical swelling soon extended to the other leg and the shoulders, and at this time the amount of pus in the urine amounted to from $\frac{1}{4}$ to $\frac{3}{4}$. No blood was ever noticed. There was a frequent desire to micturate, and much trouble from vomiting in the morning.

On March 26th, when I saw her, there had been no attack of colic for six weeks. She was then very pale and anæmic, with some œdema of the legs. There was a large left renal tumour. The urine was slightly acid, usually with $\frac{1}{3}$ to $\frac{1}{6}$ of pus, but sometimes quite free from it at several following acts of micturition. No casts or tubercle bacilli were discovered. The temperature on most evenings rose to 101°, and there were copious night sweats, but no physical signs in the chest, except a few sibilant râles, which were however most marked at the apices.

On April 2nd, I punctured and then tapped the pyonephrosis, evacuating thirteen and a-half ounces of pus, which had a peculiar and offensive smell. The two small calculi were found embedded in the kidney substance ; one, A, weighed three grains, and is conical in shape, but hollowed, the other, B, is a flat scale, a quarter of an inch in diameter; both are apparently phosphatic. The incision into the kidney was one inch long, and but little hæmorrhage occurred from the indurated renal substance. An antiseptic dressing was applied. Under chloroform the other kidney could not be felt.

She made a good recovery from the operation, though the temperature for some hours remained at 96·4°, and then rose for a few hours to 103·6°. It soon, however, fell to normal, and except an occasional evening rise to 99·2°, remained so for the rest of her stay in the hospital. The wound continued to discharge urine and a small amount of pus. The pus disappeared from the urine passed *per vias naturales*, and this though, as might have been expected, small in amount soon lost all its albumen. The patient improved very much in strength, and left the hospital in apparently good health, but with a discharging sinus.

I was not very anxious here to urge the removal of the

kidney, though I was prepared to undertake the operation if the fistula gave great trouble, because the diagnosis of strumous kidney seemed very probable; and though the urine secreted from the right kidney contained no albumen, the fact of the patient having suffered from general anasarca made it probable that it was not healthy. I have not seen her for some time, but

Fig. 3.

I am informed that she is alive and well, and that the fistula is closed, so that the wisdom of the expectant treatment has been justified by the result.

The third case was that of a young lady aged twenty-five, who was under the care of Mr. R. P. Robey, of Clapham, and was operated upon by Sir Joseph Lister, who kindly allows me to add it to this paper. She had suffered for several years from painful micturition, which had lately become much more troublesome, the pain being referred to the left ureter; while the left flank had become intensely tender, so that she could not bear any examination without an anæsthetic. There was no sign of phthisis.

In April, 1882, she was much emaciated, and in a state of great prostration. There was a large amount of pus in the urine, and, under chloroform, a considerable renal tumour could be felt on the left side. Sir Joseph Lister exposed this through a lumbar incision, and after incising it an abscess was reached, from which three or four ounces of pus, having a faint stink, spurted out forcibly. A small round abscess cavity was then discovered communicating with that first opened, but no communication with the pelvis of the kidney was made out. The capsule was dense, but stripped off readily, and the renal substance divided in opening the abscess was about $\frac{1}{3}''$ thick, and had to the naked eye a healthy appearance. It had been intended to remove the kidney, but under the circumstances disclosed it was thought best to drain the abscess,

and indeed the patient was too weak to endure so severe an operation; two drainage tubes were therefore put in, and the wound was dressed with eucalyptus gauze.

For a few days the patient was much relieved; the discharge from the wound steadily diminished, though the pus in the urine was very little if at all reduced in quantity; but then the symptoms returned with great severity, and it was decided to remove the kidney. On April 5th, however, suddenly or almost suddenly, the urine became clear, and thick pus made its appearance in the dressing. The tenderness almost disappeared at once, and the urine was passed without pain and lost all its albumen. The operation was therefore put off, and in fact has never taken place.

From this time forward there was a gradual improvement of the general condition till the health may be said to have been completely restored. There was for a long time a very copious discharge of pus from the wound, and we cannot doubt that it was mixed with urine. A certain amount of pain in micturition remained, but gradually disappeared. The tumour could no longer be felt, though for a long time there was some tenderness in the region of the kidney. The urine was generally clear, but sometimes contained a certain amount of pus. The tubes were removed after a while, and ultimately, nearly five years later, the discharge from the side, after gradually diminishing, completely ceased, and when last heard of, the patient was well.

A consideration of this case forces one to the conclusion that it was one of pyelitis, though whether strumous or calculous, or depending upon any other cause, it is impossible to say. Probably the abscess first opened was quite independent of the pelvis of the kidney, though it is just possible that it may have started in a dilated calyx which had become shut off from the general cavity. From our present point of view the important fact is that a fistulous opening into the pelvis of a chronically suppurating kidney did at last close. The patient would probably have made a good recovery had the kidney been removed after she was restored to health, provided, as is most likely, the opposite kidney was healthy, and she would then have been saved a great deal of trouble; but by trusting to the *vis medicatrix naturæ* she escaped the certain dangers of a

nephrectomy, while exposing herself only to the problematical risk of the onset of albuminoid changes, or the infection of the system by tubercle, if the renal mischief were really tuberculous.

Cases such as the three last detailed should encourage us not to be in too great a hurry in urging a patient to submit to the removal of the kidney, for it must be remembered that though the organ may be a source of discomfort and of possible danger, it still does a certain amount of work. It is exceedingly difficult, again, to estimate the exact condition of that of the opposite side, and I have shown elsewhere[1] that disturbance occurring in or in the neighbourhood of a much-diseased kidney may cause great functional derangement, amounting even to complete stoppage of secretion in that of the other side, although the latter may be much less diseased, in fact, comparatively speaking, healthy. It must also be borne in mind that the patient cannot properly estimate the possible risks of the operation, and that we have yet to learn a good deal about the history of patients who are left with only one kidney.

While, however, it is well to keep the dangers of the operation fairly in view, it should be borne in mind that, in a good number of cases, nephrectomy may be undertaken with comparative freedom from anxiety. Putting out of account the possibility of the other kidney being disordered, the principal dangers appear to be from shock and loss of blood; and of these the former is the most serious. The amount of shock again would seem to depend upon the extent of the adhesion to surrounding parts, and thus the removal of an inflamed kidney of small size is, as a rule, a much less formidable undertaking than that of a large one, and hence the great advantage of draining such a kidney and allowing it to shrink before taking it away. The removal of a kidney tumour, if it be free from the surrounding parts, produces very little disturbance; but if it be adherent, the shock will probably be severe; in fact, considering the extreme likelihood of recurrence under such circumstances, I believe it is best at once to desist from the operation if the growth have extended at all beyond the capsule. Roughly speaking, the danger of a nephrectomy may be measured by the time occupied by the operation: if this ap-

[1] *Medico-Chirurgical Society's Transactions*, vol. lxx. p. 237.

proaches or extends beyond the hour, the surgeon being busily occupied all the time in freeing the organ, the look-out for the patient is not a good one. I have extirpated the kidney four times, with only one death—that of the patient before referred to, in whom the kidney with its capsule and the contained calculi were removed with great difficulty through an abdominal incision. The other cases are: (1) that of a perfectly non-adherent tumour in a child through an abdominal incision,[1] an operation of great simplicity and involving scarcely any shock; (2) that of a healthy kidney in a child for ruptured ureter, by a lumbar incision,[2] an operation the difficulty of which consisted in finding the kidney amongst dense inflammatory tissue—the removal itself being easy when once the organ was reached; (3) a case, not before published, of renal calculus, which illustrates several of the points I have just been dwelling upon. Probably if the same line of treatment adopted here had been pursued in my first fatal case, the result would have been a different one. The following are the notes of it:—

E. B., a married woman, aged thirty-three, was admitted under my care into University College Hospital on August 13, 1883. She was nervous and excitable, and in rather needy circumstances; pale, anæmic, and emaciated, and much reduced in general health by the renal trouble and frequent floodings depending upon a polypus of moderate size growing from the interior of the uterus. She described the commencement of her symptoms as having taken place five months previously, with pain in the lower part of the abdomen before and after micturition, which before admission had become very frequent (every half-hour by day and by night); and she occasionally passed blood, sometimes in such quantity that the flow of water was stopped by clots.

On admission, a large and exquisitely tender tumour was discovered in the left flank, and tenderness was present along the course of the left ureter. The tumour was dull on percussion, but the descending colon could be felt crossing its outer and lower part. The right flank appeared normal. She was much depressed, and in almost constant pain, which was increased by lying on the right side. She had no appetite; the tongue was furred and the bowels constipated. The pulse was 96 and the temperature about 100° F. The urine acid but stinking, sp. gr. 1020, deficient in quantity (from 16 to 30 ounces *per diem*), and containing a considerable quantity of pus, enough to account for the one-third of albumen which was present.

On August 16 I examined the patient under ether, and by means of an aspirator detected the presence of calculi and stinking bloody pus in the kidney. At the same time I removed the polypus from the uterus.

The condition remained the same after this, except that the temperature

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[1] *Clinical Soc. Trans.* vol. xviii. p. 31. [2] *Ibid.* vol. xx. p. 219.

occasionally reached 101·3°, and the pulse rose to 104 and 108. She was evidently losing ground, and apparently had not long to live.

Accordingly, on August 23, I exposed the kidney by a transverse incision in the loin, four inches in length, and then made a vertical cut into its substance large enough to admit the finger, by which the opening was then considerably enlarged. The hæmorrhage was not very great, the kidney substance being thin and fibrous. Large irregular masses of stone, weighing in all 7½ drachms, the larger of which are shown in Fig. 4, were then extracted by the finger, necrosis-forceps, and a lithotomy scoop, the kidney substance being freely torn down for the purpose. The wound was then cleansed with chloride of zinc solution (40 grs. to 1 oz.) and iodoform ; a large drainage tube was inserted into the kidney, and the gaping wound was dressed with iodoform wool. The operation occupied an hour. The stone was chiefly phosphatic.

The immediate result of the operation was to produce considerable shock, but the temperature did not rise, and in the course of a few days fell to about 99°. The pulse, however, rose to 130, and was very weak. Sickness set in and lasted for five or six days. The wound at first was sloughy, but soon granulated ; the

Fig. 4.

discharge was moderate in quantity and of an offensive odour, which was more or less subdued by various antiseptic materials—iodoform, sanitas, quinine, &c. Some urine no doubt escaped from the wound. That which was passed in the natural way was scanty, but as some of it escaped into the bed it was difficult to estimate the quantity ; as, however, it reached on one occasion 40 oz. in the twenty-four hours, it was presumably not very deficient, and it was interesting to note that the pus, and with it the albumen, practically disappeared entirely and at once.

I may summarise this part of the case by saying that the patient slowly convalesced, the wound closing, except the sinus which held the tube, and that she lost all her former pain, but complained much of the soreness of the wound. The temperature was sometimes normal, but sometimes rose to 100°. The pulse gradually sank to about 92. The urine continued practically normal.

In this state she was sent down to Eastbourne on November 15, where she rapidly put on flesh, and returned after a month in very fair general health, but suffering much discomfort from the wound. If the tube were left out, an accumulation of stinking pus took place in the kidney, with accompanying pain and fulness in the loin, and whilst it was in position it caused her a good deal of

discomfort. Her temperature was seldom quite normal. The pulse was about 90 ; the urine in fair quantity (30 to 60 ounces), sp. gr. 1010 to 1020, without pus or albumen. In the meantime the kidney had shrunk to a much smaller size, though the tumour was quite perceptible.

Under these circumstances, as it appeared clear—(1) that the other kidney was healthy, (2) that she would never be able to do without the drainage tube, (3) that the left kidney was now of small size, whilst her general health was good,—I strongly urged her to submit to the removal of the offending organ ; and after some consideration she consented.

On June 12, 1884, I removed the kidney through a free crucial incision, the

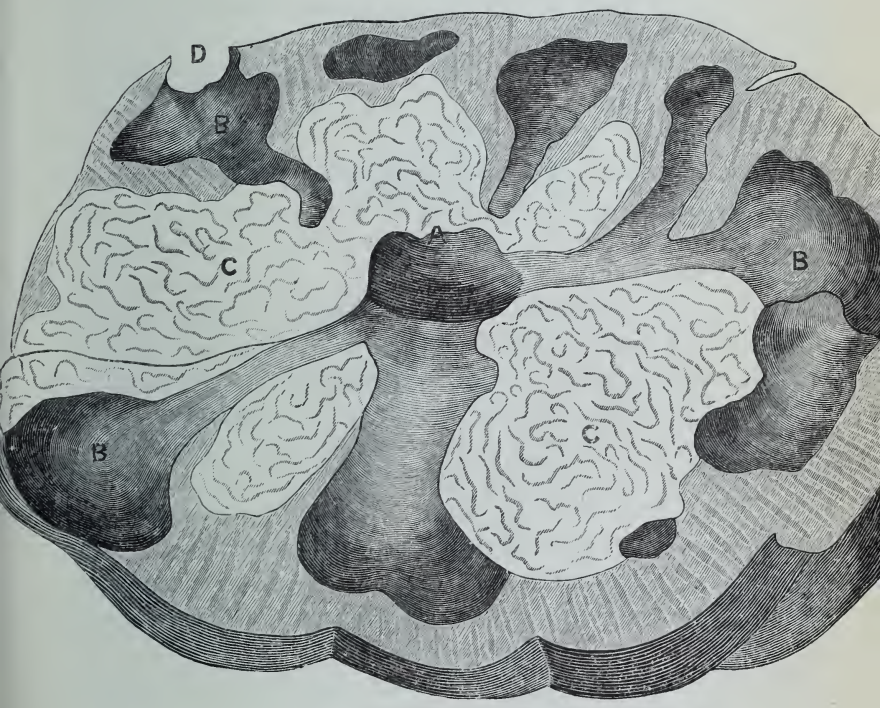

Fig. 5.

operation presenting no material difficulty or peculiarity, and the kidney stripping readily out of its capsule. The pedicle was secured with silk. The wound was purified with chloride of zinc and iodoform, and two large drainage tubes were inserted to the bottom of it ; the edges were not approximated at all, except at the extreme anterior part of the transverse incision. The operation lasted from thirty-five to forty minutes.

There was but little shock afterwards, and there is but little now to add to the history of the case. The wound soon became covered with healthy granulations, and gradually filled up from the bottom. The general health remained good, the temperature fell to normal in about ten days, but the pulse always remained about 100. The urine was in good quantity and of normal composition.

On February 23 she was again sent to Eastbourne, from which she returned a month afterwards in robust health, with the wound soundly closed, the silk ligature having made its way out before the healing was complete. She has continued up to the present time to enjoy excellent health.

The part removed consisted of the dilated and lobulated kidney (Fig. 5), together with a considerable amount of fat about the hilum, C C, the latter penetrating round the infundibula and calyces to within a quarter of an inch of the surface in some places, but on the average to within half an inch of it. The fibrous wall of the pelvis was densely cicatricial, but not thickened. The calyces and infundibula, B B, were almost obliterated at their junction with the pelvis. One calyx at the upper end was dilated into a small sac measuring one inch in diameter and containing a little gritty matter; there was also another at the lower end, in which a small calculus, one-sixteenth of an inch in diameter, was found. The kidney substance, which varied in thickness from one-sixteenth to half an inch, was dense and yellowish-white, and of an œdematous appearance. The sinus, D, opened into a small calyx at the junction of the upper and middle thirds of the posterior surface.

In this instance, then, the removal of the kidney at the first operation would have been a very serious undertaking and, as far as one could judge, would have inevitably ended fatally; whereas, when the gland had shrunk after the evacuation of its contents and the prolonged draining, it was very easy of accomplishment. I would submit that, even when the general health is good to begin with, this is the rational and right course to pursue. Such, indeed, is probably the opinion of most surgeons at the present day, though the time is not far past when it was held, on the whole, a more safe proceeding to extirpate the kidney than to evacuate the stones. It is however interesting to note that a kidney which is disorganised as the result of old inflammatory changes can be dealt with in so free a manner as was here employed, without leading to any serious hæmorrhage or to any great amount of shock.

Reference was made above to the possibility of a stone becoming impacted in the ureter. Fortunately, when once it has begun its descent, the calculus usually finds its way into the bladder; but it may be permanently arrested anywhere in its course, most frequently, it is said, at the constricted part where the ureter enters the bladder. If it does so, the stone will probably go on growing and adapt itself thus to its new position, while its further descent becomes quite impossible. In Fig. 6 is the drawing of such a stone which was removed after death from a case referred to in the earlier part of this paper.[1] The

[1] *Medico-Chirurgical Transactions*, vol. lxx. p. 237.

kidney may, as in that case, be converted into a hydronephrosis or a pyonephrosis, or it may atrophy and shrink to a small size; the symptoms will also vary very much and are often quite indistinguishable from those of ordinary renal colic. But it is sometimes possible to make an accurate diagnosis of the impaction; and then, if the symptoms be sufficiently urgent to demand an attempt at removal, it is useful to know that the ureter may be explored with the finger through a lumbar incision almost as far as the brim of the true pelvis, if the patient be not very stout or muscular. If it has passed lower down, it would be almost, if not quite, out of reach in the male, except through a

Fig. 6.

lithotomy wound, either lateral or suprapubic. In the female, however, a stone which had lodged at the extreme lower end of the ureter has been removed through the bladder after dilating the urethra (see note on page 11). As an illustration of this class of case and a conclusion of this discursive paper, I am able to add, by the kindness of Sir Joseph Lister, an interesting and perhaps unique case which occurred in his practice and which I had the opportunity of watching throughout:—

Mr. B., *æt.* 31, an officer in the Indian army, who was under the care of Mr. Charles Aikin, first came under notice on June 1, 1882. He said that as long as he could remember there had been some turbidity of the water, but that he had paid no attention to it till the year 1871, when he had an attack of renal colic, followed for a few days by symptoms of stone in the bladder, then by the passage of a small stone *per urethram*, after it had remained impacted there for a few days. A few years afterwards, probably in 1875, he had another attack of colic, but did not pass a stone for five months, during which time he was taking plenty of exercise, riding a great deal and on one occasion rowing in a severe boat-race without feeling any inconvenience whatever. Then a sore lump formed in the perinæum, and he had a difficulty in making water. He was supposed to have a stricture and was treated for one; but at last the true state of things was apparent and the stone was removed by an incision in the perinæum. Since that time (1876) the urine has undoubtedly contained pus; but he remained well until the early part of 1882, when an abscess began to form in the left loin. For this he was invalided home, the abscess being aspirated several times on the way. This told severely upon his general health, and when he reached England in May 1882, he was thin, weak, and pale, and unable to move without considerable

pain. There was a large abscess in the left loin, pointing midway between the ribs and the iliac crest. On opening this by a free incision, a small uric acid stone, obviously formed in a renal calyx, and rubbed off at the end as if facetted (showing the concentric laminæ), was found beneath the skin. The abscess ramified freely behind the kidney, the outline of which could not be made out, and it was more than doubtful if any tumour could be felt in the loin. The patient made a rapid recovery from the operation, the wound, which was dressed with eucalyptus gauze, taking the usual course of an aseptic abscess, and in a few weeks he had regained his former vigour and more than his usual weight, and went into the country. But all this time the urine contained a considerable quantity of pus.

In the end of September 1882, a renal colicky pain set in again quite suddenly, and in the course of a week an abscess formed at the seat of the original one. During a part of the week he passed a large quantity of pure limpid urine.

When seen, there was a furred tongue, complete anorexia, and some nausea. There was little or no fever, but a good deal of pain in the course of the left ureter.

I opened the abscess on October 1, in Sir J. Lister's absence, and found the ramifying track as before, but no stone. For a fortnight the abscess took a usual course, but the symptoms continued unrelieved, the urine being loaded with lithates and containing a certain amount of pus. At the end of this time pus suddenly flowed in large quantity from the wound, accompanied by urine, which soaked everything. Coincidently with this the urine became clear and all the constitutional symptoms disappeared.

But this time the abscess did not close. A large amount of urine escaped from the wound, while that which was passed naturally, though it was in fair amount, from 40 to 65 ounces *per diem* (no doubt because the patient was drinking large quantities of distilled water), contained only a trace of pus. A certain amount of discomfort was constantly felt in the position of the upper part of the left ureter.

There thus appeared every reason to think that a calculus had passed out of the kidney and become impacted in the upper part of the ureter, while the sinus communicated directly with the kidney or the ureter above the point of obstruction. The patient was now in robust health, but very much inconvenienced by the copious absorbent dressings he was obliged to wear and frequently to change.

Accordingly, on December 12, 1882, Sir J. Lister made a very free crucial incision in the loin, and attempted to follow the sinus back through the dense layers of cicatricial material to the kidney. This, however, it was found quite impossible to accomplish ; but on feeling carefully in the direction of the ureter, which was a very difficult proceeding owing to its great depth from the surface, the patient being not only very muscular but well supplied with adipose tissue, an impacted stone was discovered near the upper part of the iliac crest. The stone, which felt like a small almond, with its long diameter in the direction of the ureter, was released by incising this tube in a longitudinal direction by means of a tenotomy knife guided by the back of the index finger of the left hand. It was then hooked out of the wound by the finger, and was found to consist, like all the others, of uric acid, and to be of the shape and size indicated above.

Two large drainage tubes were inserted into the wound, which was not brought together by sutures. From this operation the patient suffered very little. He was allowed to sit up on the tenth day, so that gravity might aid the urine in finding its way along the natural channel. It was found that the amount passed by the wound gradually diminished, while that passed by the urethra increased. But the latter now again contained a considerable quantity of pus.

Convalescence was interrupted by the following drawbacks : On June 18, 1884

he had a slight attack of renal colic, which soon passed off; but was followed by an increased discharge of urine from the wound. This continued till January 26, when a probe was passed into the sinus and struck some grit, which it apparently dislodged, for the discharge of urine from the wound disappeared that night and did not return. On February 1, he passed a small stone by the urethra. On February 12 and 17, he passed two others. On February 23, an accident occurred which it may be as well to record as a warning to others. The sinus was being dilated with bougies in order to extract some grit which had been felt at the bottom, and on withdrawing one of the bougies it was found to be smeared with fæces, it having perforated the colon, which had become more or less prolapsed into the wound. This puncture, however caused no trouble beyond the escape of gas and a small amount of fæces for some days, when it completely closed and has not opened again. He passed small stones on February 24, on March 8, and March 26. On May 10 and 18, he had slight renal pains, which lasted some hours; and on June 21, he passed another small stone, and felt that there was another in his bladder, which he got rid of on the following day. He was obliged to wear a truss over the scar on account of a tendency to protusion of the colon on coughing; but except from this slight discomfort he regained his normal health, the amount of pus in the urine sinking to a very small quantity, in fact, at times being scarcely perceptible. In September 1883, he was considered sufficiently well by the India Board to be passed out again and returned to his work.

He continued in excellent health until January 1885, when he had another attack of renal colic, accompanied by a good deal of fever, and passed a stone after about a week of illness. It was three-quarters of an inch long and about a quarter of an inch wide, in shape like a miniature rhinoceros horn. It is disappointing though not surprising that he is not quite freed from his complaint; but the fact that this comparatively large calculus did not become impacted in its descent from the kidney adds another instructive feature to this interesting case, viz., that a stricture did not result from the incision made into the ureter, which thus, as in the way in which healing occurred, offers a striking parallel to the urethra in its behaviour under similar circumstances.

This patient has been so careful in keeping us posted with the progress of his case that I think we may assume that he has remained well since the time of his last recorded attack. At the time of writing—February 1885—he says, "My urine has been and is constantly tested; at the worst it had only a little pus and very little albumen and no blood in it. I am sending some more to-morrow, and it looks to me now clearer than it has done for years."